

**QUALITY ASSURANCE PROVISIONS (QAP)
FOR THE
CARTRIDGE, SIGNAL, PRACTICE BOMB, MK 4 MOD 3**

I. QUALITY SYSTEM REQUIREMENTS

- A. The Contractor shall implement and maintain a quality system meeting the requirements of ISO 9001-2000 (only design/development exclusions permitted)(or 9002-1994). The quality system shall also implement the following provisions:
1. Subcontractors producing critical and/or major characteristics shall have a quality system compliant to ISO 9001-2000 (only design/development exclusions permitted)(or 9002-1994).
 2. When property is furnished by the Government, the Contractor shall implement the following:
 - (a) Examination upon receipt, consistent with practicality, to detect damage upon transit;
 - (b) Inspection for completeness, quantity and proper type;
 - (c) Periodic inspection and precautions to assure adequate storage conditions and to guard against damage from handling and deterioration during storage;
 - (d) Identification and protection from improper use or disposition.
 3. Process and Production Control conditions shall include:
 - (a) Documented manufacturing planning for the implementation and control of manufacturing operations. The planning shall include: a description of operations, facility, environmental equipment, and tooling requirements, associated controls, and a process flow chart to portray the process of fabrication and assembly in terms of key operations.
 - (b) Accountability for all product.
 - (c) Evidence that all manufacturing, test, and inspection operations have been completed in sequence, as planned, or as otherwise documented and authorized.
 - (d) Preparation of documented process monitoring, accountability, and operator instructions for all processes that affect product quality. These instructions are to be accessible at the point where work is performed and shall, as a minimum, contain reference to the following: workmanship standards, manufacturing aids, step by step instructions for performing operations, equipment or tools required, special conditions to be maintained, identification of special handling devices, and methods for recording completion of operations.
 4. The contractor's calibration system shall be in accordance with ANSI/NCSL Z540-1-1994 or ISO 10012.
 5. Control of nonconforming material shall include:
 - (a) Controls applied to suspect product as well as to nonconforming product.
 - (b) The proposed use or repair of product that does not conform to specified requirements shall be submitted to the Government prior to use or repair. Rework and repair shall be in accordance with applicable contract clause. Repetitive nonconformances will not be approved.
 - (c) The Contractor shall promptly notify the Government when a nonconformance is found in the Contractor's processes or products that may affect product already delivered.
 6. Corrective action shall be required of a subcontractor when it is determined that the root cause of the nonconformity is the responsibility of the subcontractor.
 7. Internal audits shall cover all quality management related processes, activities, and shifts, and shall be scheduled according to an annual plan.
- B. The above provisions shall be addressed in the Quality System Plan.

II. QUALITY SYSTEM PLAN AND INSPECTION AND TEST PLAN

- A. Quality System Plan: The Contractor shall prepare a Quality System Plan (QSP) in accordance with the applicable CDRL, ADL, and this QAP. The QSP shall provide traceability from the specific quality elements of the contract to the specific Contractor resources (systems, processes, personnel, etc.) that support those elements, and include quality system measures of effectiveness. The QSP provides the Government a basis for assessment of the quality system and evidence of the Contractor's intent to comply with the contract quality requirements.
1. The QSP shall include:
 - (a) A summary of the contract quality requirements, and
 - (b) A relational matrix. The matrix shall indicate the general relationship between the applicable quality system elements of the contract and QAP and the Contractor's quality system procedures/processes. The matrix, or an attachment thereto, shall also identify schedules or quality activities and tasks which must be coordinated

- and compatible with other schedules prepared for work under the contract, as well as include the name(s) of the person(s) responsible for accomplishments of activities and tasks.
2. The QSP shall identify the means by which the Contractor will ensure quality system effectiveness and demonstrate comprehensive management and review of data, such that the results may be used to indicate trends and progress in quality processes, fabrication, assembly, test and acceptance as appropriate to the contract. The QSP shall describe what is measured, how often it is tracked, and who reviews and assures that appropriate action is initiated when trends are unfavorable.
 3. A copy of the Contractor's quality manual that describes the current quality system shall be attached.
- B. Inspection and Test Plan: The Contractor shall prepare an Acceptance Inspection and Test Plan (ITP) in accordance with the applicable CDRL and the following format:
1. General Format: The ITP shall, at minimum, contain the following:
 - (a) Cover sheet identifying item, contract number, and revision letter and date of the plan.
 - (b) All of the inspections and tests required for acceptance of the item, documented in accordance with the requirements herein.
 - (c) A section of the ITP for inspection and test equipment maintenance, recertification, and recalibration, documented in accordance with the requirements herein.
 2. Format for Documenting Tests and Inspections: For each required inspection or test, including those inspections or tests that are contained in specifications, specific instructions shall be prepared and shall contain the following:
 - (a) Identification of the item to be inspected and/or tested, including part number, revision letter, and nomenclature.
 - (b) The location of the characteristic, to include the drawing sheet and zone, a brief description of the characteristic, and for classified characteristics, the classification callout.
 - (c) Criteria for passing or failing the inspection or test (such as the high and low limit for a particular dimension, a particular minimum tensile strength, minimum voltage, etc.).
 - (d) Details of the sampling plan to be used, including, as applicable, lot size, sample size, and verification levels.
 - (e) Identification of inspection and test equipment using appropriate identification data visible on the equipment. Standard instruments such as a caliper or micrometer do not require a one to one identification description and can be identified simply as "caliper" or "micrometer".
 - (f) A written procedure for performing the inspection or test when the characteristic is other than a simple plus or minus tolerance dimension which is measured by the use of a standard instrument such as a caliper or micrometer. The procedure may be placed in an appendix of the plan and referenced if the procedure is lengthy or repeatedly used.
 - (g) The manner in which the result of the inspection or test is to be recorded, such as a particular data sheet. Identify the information to be recorded for each inspection or test, to include but not limited to: traceability to item and inspection or test characteristic, inspection or test data to be recorded (attribute or variable data for each reading), traceability to inspection or test equipment, and pass/fail disposition.
 3. Format for Inspection and Test Equipment Maintenance, Recertification, and Recalibration Schedule: A separate section, or attachment to the ITP shall address inspection and test equipment maintenance, recertification, and recalibration. For each acceptance gage, or other measurement device (including standard measuring instruments) used for final acceptance, the following information shall be documented:
 - (a) A description of the gage or measuring device, including identification data visible on the equipment.
 - (b) A schedule for recertification of the gage or measurement device in terms of gage passes or time limit.
 - (c) Inspection and test equipment used for acceptance of CRITICAL and MAJOR characteristics shall require design approval in accordance with applicable CDRL. A copy of the approval shall be included. Inspection and test equipment used for acceptance of other characteristics (i.e., MINOR) shall require approval in accordance with applicable CDRL. A copy of the approval shall be included.
 4. The above format shall be used for all required inspection and tests regardless of whether the inspections or tests are performed by a subcontractor. When inspections or tests are performed by a subcontractor, all of the above information shall be provided by the subcontractor or obtained by subsequent receipt test or inspection or final acceptance by the prime Contractor. When inspections or tests are performed by a subcontractor, the prime Contractor shall review the relevant specifications and create a receipt inspection or test review sheet to review the subcontractor's inspection and test data to ensure conformity to contractual requirements. In-process or statistical production inspections and tests, which are used for purposes of manufacturing material, which will later be verified by an acceptance inspection or test, need not be documented in the plan.

- C. Approved inspection and test equipment shall be made available for use by the Government when required to determine conformance with contract requirements. If conditions warrant, Contractor personnel shall be made available for operation of such devices and for verification of their accuracy and condition.

III. INSPECTION AND TEST REQUIREMENTS

- A. The Contractor, in performing sampling inspection or test of the product(s) being manufactured/delivered under this contract, shall, as a minimum, comply with the requirements set forth below without jeopardizing quality:
1. Characteristics classified on the drawings or in separate documents as CRITICAL shall be verified 100%.
 2. Characteristics classified on the drawings or in separate documents as MAJOR shall be verified by characteristic using MIL-STD-1916, Verification Level (VL)-IV.
 3. Characteristics classified on the drawings or in separate documents as MINOR shall be verified by characteristic using MIL-STD-1916, Verification Level (VL)-II.

Notes:

1. The above criteria will apply except where sampling plans and acceptance criteria appear in the product and/or affiliated specifications, or where authorization to deviate from these requirements has been obtained in accordance with contract requirements.
2. MIL-STD-1916 will form the basis of the sampling inspection program. Those elements of MIL-STD-1916 related to sampling inspection will also apply (e.g., switching rules, non conformance disposition, etc.) Switching from normal to reduced inspection per MIL-STD-1916 shall be approved by the Government prior to implementation. Reduction of test and inspection requirements will be as defined elsewhere in the QAP and contract.
3. MIL-STD-1916 is not intended for use with destructive testing. Should sampling with destructive testing be required, an accompanying sampling plan will be provided in the technical documentation or herein.
4. If the use of an alternate sampling plan (other than those specified above) is desired, it shall be documented in detail to show factors such as lot size, sample size, acceptance criteria, and operating characteristic curves, and submitted for approval in accordance with the contract requirements.
5. Characteristics other than product attributes-processing requirements specified on drawings that are classified as CRITICAL, MAJOR, or MINOR are exempt from the inspection requirements of the plans above. However, these processes shall be controlled in accordance with the inspection system and/or quality program requirements of the contract.

IV. STATISTICAL PROCESS CONTROL PROGRAM

The contractor's implementation of the SPC program shall be documented in accordance with the applicable CDRL and contract clause (with scope of work).

V. ACCEPTANCE REQUIREMENTS

- A. First Article Inspection and Test:
1. First Article Inspection and Test (FAT) shall be conducted by the Contractor and witnessed by the QAR IAW AS 6147 and this QAP.
 2. FAT will consist of:
 - a. Red phosphorous inspection and test
 - b. Examination and test, in the following order:
 - (1) Examination for drawing conformance and workmanship
 - (2) Examination of in-process inspection records
 - (3) X-ray examination
 - (4) Static functioning test (May be witnessed by Government Representatives)
 3. Preparation of FAT Sample:
 - a. The FAT sample shall consist of 100 cartridges plus 3 sets of all components (all documents referenced through Dwg 398800).
 - b. All characteristics comprising FAT cartridges (components and cartridges) and additional components will be verified by Contractor and witnessed by QAR.
 - c. The Contractor shall provide all supporting verification data. Verification data shall include, but not limited to, all in process and final inspection records, test records, certifications, etc., to indicate conformance and

acceptability. Government Representatives will review results of the Contractor verification during Government Verification of FAT.

4. **Government Verification of FAT:**

- a. Government Verification of FAT will commence at completion of Contractor verification.
- b. Government Representatives will review verification data and conduct reinspection of selected characteristics of the cartridges and components.
- c. Government Representatives may witness static functioning test. Witnessing shall be coordinated prior to start of testing.

Notes:

1. The First Article will consist of items that are considered acceptable by both the Contractor and Government. An acceptable lot of first articles will be required before approval can be given to proceed with production. Technical approval will be provided by Naval Air Warfare Center Weapons Division, Point Mugu, CA. Final approval, conditional approval, or rejection of the first article sample will be given by the Contracting Officer. Production before approval is at Contractor's risk. The First Article shall be representative of items to be manufactured using the same processes and procedures as contract production. The approved First Article will not serve as a manufacturing standard.
2. The Contractor shall hold First Article samples (3 sets of components) until completion of contract

B. **Lot Acceptance Inspection and Test:**

1. Lot Inspection and Test shall be conducted by the Contractor and witnessed by the QAR IAW AS 6147, Table I.
2. Lot Size: Lot size for cartridge acceptance inspection and test shall be not less than 6000 or not greater than 27,000 cartridges, plus samples.
3. Lot Sample Plan
 - a. Lot sampling shall be IAW QAP for Group A inspections. Group A inspections are considered MAJOR characteristics for sampling purposes.
 - b. A sample of 100 cartridges shall be randomly selected for those cartridges successfully passing Group A inspections for Group B examination and test.
4. Lot Acceptance: All sample cartridges shall meet requirements of AS 6147, Table I. One failure is cause for rejection of lot.

Notes:

1. Cartridges from not more than two (2) production lots may be palletized on any single pallet providing that all are being shipped to a single destination and the DD-250 outlines the quantities from each lot. Forward two (2) copies of the Ammunition Data Card with each complete or partial lot shipped.
2. Lot Acceptance samples not undergoing X-ray and static functioning test may be returned to the lot.

C. **First Article And Lot Acceptance Reporting:** At conclusion of first article and lot acceptance inspection and testing, the Contractor shall prepare test reports in accordance with CDRL requirements.

D. **Ammunition Data Reporting:** The Contractor shall prepare Ammunition Data Cards in accordance with CDRL and deliver with each deliverable lot.

E. **Performance Orientated Packaging Testing:** The Contractor shall submit five (5) random production sample boxes in accordance with drawing 923AS504, note 14 for performance oriented packaging testing.

F. **Quality System Review:** A quality system review concurrent with first article, first lot acceptance or during production may be conducted to evaluate the Contractor's quality system, processes and procedures inherent to the quality of items to be delivered under this contract. The review shall be conducted by Government Representatives designated by the Contracting Officer.

VI. TEST AND INSPECTION REDUCTION OR ELIMINATION

- A. The Government will consider reduction or elimination of selected acceptance test or inspection based upon first article, preproduction, and lot acceptance test results when supported by evidence of both process stability and capability. Contractor written requests shall be made through the Administrative Contracting Officer to the Contracting Officer. Approval will be based upon the contractor's quality system plan, statistical process control plan, and implementation and validation of the process control techniques and corresponding results.

- B. Product quality is principally the result of process design and control. As such, the contractor shall develop process and product control methods that limit product variation and provide evidence of product conformance. Process control techniques include but are not limited to: calibrated and controlled tooling, computer numerical control machining, set-up verification, and statistical process control. Based on process control techniques, complexity of product characteristics, and length of steady state production, the contractor shall select product characteristics for potential reduction of reliance on acceptance test and inspection. Government representatives may assist the contractor during post award, first article, and other technical exchanges to identify product characteristics for potential test and inspection reduction or elimination.
- C. The contractor may switch from normal to reduced sampling test and inspection in accordance with the contract provisions. Further reductions or elimination will be based on the Contracting Officer approval of contractor written requests. Prior to submitting a written request, the contractor's Quality System Plan, Acceptance Inspection and Test Plan, and SPC Program Plan shall have been approved by the Government. The Government will consider reduction or elimination of selected acceptance test or inspection based upon the process control evidence provided. As a minimum, documentation submitted for evaluation should address the following:
 - 1. Identification of the characteristic(s) for potential reduction, the inspection provision to be replaced, and an evaluation of the protection provided by the alternate methods as compared with the inspection requirement to be replaced.
 - 2. Evidence of process control and capability during production together with adequate criteria, measurement, and evaluation procedures to maintain control of the process.
 - 3. Assessment plan to periodically verify process stability and capability, and requirements for returning to normal acceptance .
 - 4. Corrective action plan to be implemented when evidence of loss of process control or significant process degradation arises. Evidence of loss of statistical control or degradation below a Cpk of 1.33 shall require immediate corrective action in accordance with the statistical process control program.
- D. Once the Government approves alternate acceptance methods, reports containing internally generated process control metrics shall be made available upon request.
- E. The Government will not consider requests for reduction or elimination of 100% acceptance inspection and testing of parameters or characteristics identified as CRITICAL.
- F. The Government reserves the right to withdraw approval of alternate acceptance methods that the Government determines provide less assurance of quality than the inspection requirements originally specified or when the inability to maintain process stability and capability becomes apparent. Any break in production greater than 90 days shall require a return to normal acceptance inspection and testing.

VII. DOCUMENTATION REQUIREMENTS

- A. Required documentation (e.g., QSP, ITP, SPC) shall be submitted in accordance with applicable CDRL. The contractor shall be responsible for any delays resulting from late submittals or delays resulting from submittal of inadequate documentation.
- B. Documentation shall be maintained and updated as necessary. Updates (changes/revisions) shall consist of notes or changes, clearly identified as to where applicable (i.e., system element, page, paragraph number, etc.) Updates shall be submitted in accordance with CDRL requirements.